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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/901,837	07/10/2001	Shubneesh Batra	MCRO:199--3/FLE 95-0057.0	9030
7590	10/21/2003		EXAMINER EVERHART, CARIDAD	
			ART UNIT 2825	PAPER NUMBER

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DATE MAILED: 10/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/901,837

Applicant(s)

BATRA ET AL.

Examiner

Caridad M. Everhart

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-65 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-41, 43-46, 48-61, 63 and 64 is/are rejected.
- 7) ☒ Claim(s) 42, 47, 62 and 65 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

In view of the reply under 37CFR1.111 filed on 7-18-03, PROSECUTION IS HEREBY REOPENED. A rebuttal of the reply brief is set forth below with respect to claims 1,30-41,43-46,48-61,63, and 64.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Amendment

The amendment filed 3-12-03 has been entered, thus obviating the 112 rejection made in paper No. 8.

Response to Arguments

Applicant has traversed the argument made in the Advisory Action that the W portion taught by Joshi can be interpreted as a portion of the conductive layer because the W forms a hard cap and is not a portion of the conductive layer. Although applicant's argument is factual, this argument is not persuasive with respect to the allowability of the claims, because a portion is defined as "a part", and a part of a whole can include the whole. It is believed that the definition of a part includes the whole as being a part. Therefore, it is believed that Joshi continues to read on the claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1,30-36 38-41,43-45,47-57,59-61,63, and 64 are rejected under 35 U.S.C. 102(e) as being anticipated by Joshi, et al. (US 5,897,370).

Joshi discloses the steps of providing a substrate comprising a contact hole in a dielectric layer which exposes a portion of the substrate(col. 6, lines 46-55 and 65-67), depositing conductive material comprising aluminum(col. 5, lines 35-48), depositing an impurity into the conductor which lowers the melting point of the conductor, and reflowing(col. 7, lines 28-34). The impurity comprises Ge , and the temperature of reflow is within the range recited in the instant claims(col. 8, lines 1-8). With respect to the limitation of the impurity migrating out of the contact hole, Ge would be able to migrate out of the contact hole, depending on the temperature, so that this is interpreted as satisfying the limitation that the impurities migrate out of the contact hole. With respect to the limitation that the impurities do not migrate out of the hole, the formation of a eutectic(col. 7, lines 57-59) is interpreted as satisfying this limitation. With respect to the limitation of the percentage of the lowering of the melting point of the material, the

fact that the reflow temperature is within the range recited in the claims is interpreted as satisfying this limitation. With respect to the limitation of the impurity being deposited after 70% of the conductive material is deposited, this limitation is satisfied by the impurity being deposited after the hole is filled satisfies "after 70%" because after the hole is filled includes after 70%. With respect to the limitation of the steps being performed simultaneously, this limitation is satisfied (col. 8, lines 35-39), by the GeH₄ being simultaneously deposited. The reflowing is included (col. 1, lines 28-33), as the temperature taught for deposition is (col. 1, lines 28-33) is the same as the reflow temperature (col. 7, lines 28-33). Because the GeH₄ may be flowed over the conductor, and then form the eutectic (Fig. 2b and col. 8, lines 1-7), this is interpreted as satisfying the limitation of the impurity migrating as recited in claim 53. The impurity remaining in place is satisfied by the codeposition embodiment (col. 8, lines 35-39).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 37, 46, 58, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joshi et al as applied to claim 30 above and further in view of Xu, et al. (US 5,962,923).

Joshi is silent with respect to intermittent deposition.

Xu teaches intermittent deposition of impurity as shown in Fig. 1 and described in col. 7, lines 20-45 as the carrier layer. The carrier layer allows a low reflow temperature for the filling of the opening(col. 7, lines 48-6).

One of ordinary skill in the art would have been motivated to have carried out the impurity deposition intermittently in the process taught by Joshi as taught by Su in order to obtain the same lowering of the reflow temperature as is achieved by the process taught by Joshi.

Allowable Subject Matter

Claims 42,47,62, and 65 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 703-308-3455. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 703-308-1323. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

CME
Caridad Everhart
October 17, 2003



MATTHEW SMITH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800